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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 1 of 5

Complete if Known	
Application Number	09/742,421
Filing Date	December 22, 2000
First Named Inventor	Sofiène Affes
Group Art Unit	2661
Examiner Name	
Attorney Docket Number	AP660761US

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	U.S. Patent Document Number	Kind Code[2] (if known)	Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1A	6,097,771		Foschini	08-01-2000	
	1B	6,067,290		Paulraj et al.	05-23-2000	
	1C	5,341,395		Bi	08-23-1994	
	1D	5,761,237		Petersen et al.	06-02-1998	
	1E	5,872,776		Yang	02-16-1999	
	1F	5,363,403		Schilling et al.	11-08-1994	
	1G	5,467,368		Takeuchi et al.	11-14-1995	
	1H	5,553,062		Schilling et al.	09-03-1996	
	1I	5,563,610		Reudink	10-08-1996	
	1J	5,621,752		Antonio et al.	04-15-1997	
	1K	5,648,968		Reudink	07-15-1997	
	1L	5,719,852		Schilling et al.	02-17-1998	
	1M	5,734,647		Yoshida et al.	03-31-1998	
	1N	5,799,004		Keskitalo et al.	08-25-1998	
	1O	5,859,879		Belgiano et al.	01-12-1999	
	1P	5,862,124		Hottinen et al.	01-19-1999	
	1Q	6,887,034		Suzuki	03-23-1999	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Office[3]	Number[4]	Kind Code[5] (if known)	Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	1R	EP	0 951 091 A2		Lucent Technologies	10-20-1999		
	1S	EP	0 491 668 A2		Ericsson - GE Mobile	06-24-1992		
	1T	EP	0 641 102 A2		Philips Electronics UK	Limited 03-01-1995		
	1U	WO	97/02666		Nokia Telecommunications OY	01-23-1997		
	1V	WO	99/01946		Nokia Telecommunictions OY	01-14-1999		
	1W	CA	2,202,116		Liang Hsu et al.	01-18-1998		
	1X	EP	0 526 439 A1		Ericsson - GE Mobile	02-03-1993		
	1Y	EP	0 615 355 A2		NTT Mobile Communications	09-14-1994		
	1Z	WO	92/10890		Qualcomm Incorporated	06-25-1992		

Examiner Signature		Date Considered	5/24/04

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Sheet 2 of 5

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Application Number	09/742,421
Filing Date	December 22, 2000
First Named Inventor	Sofiène Affes
Group Art Unit	2661
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Attorney Docket Number	AP660761US

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
	2A	"Wideband DS-CDMA for next generation mobile communications systems", by F. Adachi, M.Sawahashi and H. Suda in IEEE communications Magazine, vol. 36, No. 9, pp. 55-69, September 1998.	
	2B	"Multiuser detection for CDMA systems", by A. Duel-Hallen, J. Holtzman, and Z. Zvonar in IEEE Personal Communications, pp. 46-58, April 1995.	
	2C	"Multi-user detection for DS-CDMA communications", by S. Moshavi in IEEE Communications Magazine, pp. 124-136, October 1996.	
	2D	"Minimum probability of error for asynchronous Gaussian multiple-access channels", by S. Verdu in IEEE Trans. on Information Theory, vol. 32, no. 1, pp. 85-96, January 1986.	
	2E	"Optimum detection of code division multiplexed signals", by K.S. Schneider in IEEE Trans. on Aerospace and Electronic Systems, vol. 15, pp. 181-185, January 1979.	
	2F	"Cancellation techniques of co-channel interference in asynchronous spread spectrum multiple-access systems", by R. Kohno, M. Hatori, and H. Imai in Electronics and Communications in Japan, vol. 66-A, no. 5, pp. 20-29, 1983.	
	2G	"A family of suboptimum detectors for coherent multi-user communications", by Z. Xie, R.T. Short, and C.K. Rushforth in IEEE Journal on Selected Areas in Communications, vol. 8, no. 4, pp. 683-690, May 1990.	
	2H	"Very low rate convolutional codes for maximum theoretical performance of spread-spectrum multiple-access channels", by A.J. Viterbi in IEEE Journal of Selected Areas in Communications, vol. 8, no. 4, pp. 641-649, May 1990.	
	2I	"Multistage detection in asynchronous code-division multiple-access communications", by M.K. Varanasi and B. Aazhang in IEEE Trans. on Communications, vol. 38, no. 4, pp. 509-519, April 1990	
	2J	"Combination of an adaptive array antenna and a canceller of interference for direct-sequence spread-spectrum multiple-access system", by R. Kohno et al. in IEEE Journal on Selected Areas in Communications, vol. 8, no. 4, pp. 675-682, May 1990.	
	2K	"Decorrelating decision-feedback multi-user detector for synchronous code-division multiple-access channel", by A. Duel-Hallen in IEEE Trans. on Communications, vol. 41, no. 2, pp. 285-290, February 1993.	

Examiner Signature	S. Moore	Date Considered	5/24/04

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Complete if Known	
Application Number	09/742,421
Filing Date	December 22, 2000
First Named Inventor	Sofiène Affes
Group Art Unit	2661
Examiner Name	
Attorney Docket Number	AP660761US

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	3A	"Zero forcing and minimum mean-square-error equalization for multi-user detection in code-division multiple-access channels", by A. Klein, G.K. Kaleh, and P.W. Baier in IEEE Trans. on Vehicular Technology, vol. 45, no. 2, pp. 276-287, May 1996.	
	3B	"A new receiver structure for asynchronous CDMA : STAR - the spatio-temporal array-receiver", by S. Affes and P. Mermelstein in IEEE Transactions on Selected Areas in Communications, vol. 16, no. 8, pp. 1411-1422, October 1998.	
	3C	"An algorithm for multisource beamforming and multitarget tracking", by S. Affes, S. Gazor, and Y. Grenier in IEEE Trans. on Signal Processing, vol. 44, no. 6, pp. 1512-1522, June 1996.	
	3D	"Analysis of a simple successive interference cancellation scheme in a DS/CDMA system", by P. Patel and J. Holtzman in IEEE Journal on Selected Areas in Communications, vol. 12, no. 5, pp. 796-807, June 1994.	
	3E	"Partial decorrelating detection for DS-CDMA systems", by J. Choi in Proceedings of IEEE PIMRC '99, Osaka, Japan, vol. 1, pp. 60-64, September 12-15, 1999.	
	3F	"Signal Processing Improvements for Smart Antenna Signals in IS-95 CDMA", by S. Affes and P. Mermelstein in Proceedings of IEEE PIMRC '98, Boston, U.S.A., Vol. II, pp. 967-972, September 8-11, 1998.	
	3G	"Performance of a CDMA beamforming array-receiver in spatially-correlated Rayleigh-fading multipath", by S. Affes and P. Mermelstein in Proc. of IEEE VTC'99, Houston, USA, May 16-20, 1999.	
	3H	"A beamformer for CDMA with enhanced near-far resistance", by H. Hansen, S. Affes and P. Mermelstein in Proc. of IEEE ICC'99, Vancouver, Canada, Vol. 3, pp. 1583-1587, June 6-10, 1999.	
	3I	"Impact of synchronization on receiver performance in wideband CDMA networks", by K. Cheikhrouhou, S. Affes, and P. Mermelstein in Proc. of 34th Asilomar Conference on Signals, and Computers, Pacific Grove, USA, to appear, October 29-November 1, 2000.	
	3J	"A High Capacity CDMA Array-Receiver Requiring Reduced Pilot Power", by S. Affes, A. Louzi, N. Kandil, and P. Mermelstein in Proc. IEEE GLOBECOM'2000, San Francisco, USA, vol. 2, pp. 910-916, November 27-December 1, 2000.	
	3K	"Interference subspace rejection in wideband CDMA - part I: Modes for mixed power operation", by S. Affes, H. Hansen, and P. Mermelstein, submitted to JSAC, October 2000.	

Examiner Signature	S. Moore	Date Considered	5/24/04

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Sheet 4 of 5

Complete if Known	
Application Number	09/742,421
Filing Date	December 22, 2000
First Named Inventor	Sofiène Affes
Group Art Unit	2661
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Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
	4A	"Interference subspace rejection in wideband CDMA - part II: Modes for high data-rate operation", submitted by H. Hansen, S. Affes, and P. Mermelstein to JSAC, October 2000.	
	4B	"Spreading codes for direct sequence CDMA and wideband CDMA cellular networks", by E.H. Dinan and B. Jabbari in IEEE Communications Magazine, vol. 36, no. 9, pp. 48-54, September 1998.	
	4C	"Near-far resistance of multiuser detectors in asynchronous channels", by R. Lupas and S. Verdu in IEEE Trans. on Communications, vol 38, no 4, pp 496-508, April 1990.	
	4D	"A family of multiuser decision-feedback detectors for asynchronous code-division multiple-access channels", by A. Duel-Hallen in IEEE Trans. on Communications, vol. 43, no. 5, pp. 796-807, June 1994.	
	4E	"Coded asynchronous CDMA and its efficient detection", by C. Schlegel, P. Alexander, and S. Roy in IEEE Trans. on Information Theory, vol 44, no 7, pp. 2837-2847, November 1998.	
	4F	"A matrix-algebraic approach to successive interference cancellation in CDMA", by L.K. Rasmussen, T.J. Lim, and A.-L. Johansson in IEEE Trans. on Communications, vol. 48, no. 1, pp. 145-151, January 2000.	
	4G	"LMMSE detection for DS-CDMA systems in fading channels", by M. Latva-aho and M.J. Juntti in IEEE Trans. on Communications, vol. 48, no. 2, pp. 194-199, February 2000.	
	4H	"Spatio-Temporal Array-Receiver for Multipath Tracking in Cellular CDMA", by S. Affes and P. Mermelstein in 1997 IEEE International Conference on Communications, vol. 3, June 8-12, 1997, Montreal, Canada, pp. 1340-1345.	
	4I	"Interference Subspace Rejection in Wideband CDMA: Modes for Mixed-Power Operation", by S. Affes, H. Hansen, and P. Mermelstein in Proc. of IEEE ICC'01, Helsinki, Finland, to appear, June 11-15, 2001.	
	4J	"Pilot-Assisted STAR for Increased Capacity and Coverage on the Downlink of Wideband CDMA Networks", by S. Affes, A. Saadi, and P. Mermelstein in Proc. of IEEE Signal Processing Workshop on Signal Processing Advances in Wireless Communications SPAWC'01, Taoyuan, Taiwan, to appear, March 20-23, 2001.	
	4K	"Near-Far Resistant Single-User Channel Identification by Interference Subspace Rejection in Wideband CDMA", by S. Affes, H. Hansen, and P. Mermelstein in Proc. of IEEE Signal Processing Workshop on Signal Processing Advances in Wireless Communications SPAWC'01, Taoyuan, Taiwan, pp. 54-57, March 20-23, 2001.	

Examiner Signature	S. Bocure	Date Considered	5/24/04

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Sheet 5 of 5

Complete if Known	
Application Number	09/742,421
Filing Date	December 22, 2000
First Named Inventor	Sofiène Affes
Group Art Unit	2661
Examiner Name	
Attorney Docket Number	AP660761US

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	5A	"Space/Time Multipath Separation and Equalization in Asynchronous CDMA using the Spatio-Temporal Array-Receiver", by S. Affes and P. Mermelstein in 1997 IEEE 6th International Conference on Universal Personal Communications Record, San Diego, California, pp. 510-515, October 12-16, 1997.	
	5B	"Blind Adaptive Multiuser Detection in Multipath CDMA Channels Based on Subspace Tracking" by X. Wang and H.V. Poor in IEEE Transactions on Signal processing, vol. 46, No. 11, pp. 3030-3044, November 1998.	

Examiner Signature	J. Moore	Date Considered	8/24/04

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